calculations. There is poor agreement for MLA estimation between all the imaging modalities studied, including IVUS-OCT, thus their values are not interchangeable.

## TCT-655

**Effectiveness of thrombo-aspiration therapy in patient with acute myocardial infarction; an optical coherence tomography study**

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**Background:** Background- Manual thrombus aspiration is a helpful adjunctive therapy of percutaneous coronary intervention (PCI) in patients with ST-segment elevation myocardial infarction (STEMI). Previous studies have demonstrated that tissue protrusion within the stent is associated with clinical outcomes after PCI. We used optical coherence tomography (OCT) to evaluate the impact of thrombus aspiration prior to balloon or stent angioplasty on tissue protrusions after stenting in patients with STEMI.
**Methods:** Methods- A total of 101 patients with STEMI who underwent standard PCI (n=41) or thrombus-aspiration PCI (n=60) were examined in the present study. Mean duration between symptom onset and primary PCI was 5.7 ± 4.2 hours. OCT was performed after PCI to assess lesion morphology in the stented segment.
**Results:** Results- Baseline patient characteristics and stent profiles were comparable between the thrombus-aspiration and the standard PCI group. After primary PCI, TIMI flow grade >2 was attained in 92% in the thrombus-aspiration group compared with 90% in the standard PCI group (P>0.9). OCT measurements at maximl tissue protrusion area site demonstrated similar stent area (8.1 ± 2.8 mm2 vs. 7.6 ± 2.7 mm2, p=0.7), significantly smaller tissue protrusion area (0.5 ± 1.0 mm2 vs. 1.8 ± 1.6 mm2, p<0.05) and significantly greater lumen area (7.6 ± 2.6 mm2 vs. 5.7 ± 2.7 mm2, p<0.05) in the thrombus-aspiration PCI group compared to the standard PCI group.
**Conclusion:** Conclusions- Thrombus aspiration prior to balloon or stent angioplasty in patients with STEMI prevents tissue protrusion after stening and preserves luminal area in the treated segment, and it therefore represents a useful adjunctive therapy in primary PCI.

## TCT-656

**Relation between the multivessel disease and culprit lesion morphology in acute coronary syndrome -An optical coherence tomography study-**

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**Background:** Several studies have demonstrated that multivessel disease (MVD) was an independent predictor for coronary plaque progression and recurrent acute coronary events. Optical coherence tomography (OCT) is a feasible technique for the identification of thin-cap fibroatheroma (TCFA) in vivo. The aim of this study was to examine the relation between MVD and culprit lesion morphology as determined by OCT in patients with acute coronary syndrome (ACS).
**Methods:** A total of 124 culprit plaques in 124 patients with ACS (34 patients with AMI and 90 patients with unstable angina pectoris) were interrogated by OCT before percutaneous coronary intervention. Minimum fibrous cap thickness and mean fibrous cap thickness of the most diseased 10 mm segment (at 1 mm intervals) in the culprit lesion were measured by OCT. Lipid-rich plaque was defined as a plaque with lipid in 2 or more quadrants, and TCFA was defined as a lipid-rich plaque with fibrous cap thickness< 65 μm.
**Results:** Coronary plaques of single, double, and triple vessel disease were identified in 67 (54%), 38 (31%), and 19 patients (15%), respectively. Culprit plaques in patients with MVD had significantly thinner minimum and mean fibrous cap thickness compared with those with single vessel disease (56 vs 77 μm, P<0.001 and 138 vs 175 μm, P<0.001, respectively). The frequency of TCFA (81% vs 51%, P=0.001), plaque rupture (67% vs 39%, P=0.002), thrombus (91% vs 75%, P=0.014), and lipid-rich plaques (93% vs 70%, P=0.001) were higher in patients with MVD than in those with single vessel disease. Multiple plaque rupture in the culprit vessel were observed more frequently in patients with MVD than in those with single vessel disease (18% vs 5%, P=0.018).
**Conclusion:** In patients with ACS, MVD was associated with more vulnerable culprit plaque morphology as compared with those with single vessel disease. Therefore, patients with MVD may have heightened coronary vulnerability and may require more detailed assessment and more aggressive therapy even after successful treatment for culprit lesions.

## TCT-657

**Assessment of Atherosclerosis at Coronary Bifurcations with Multislice Computed Tomography and Intravascular Ultrasound-Virtual Histology**

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**Background:** Pathological examinations have shown that high-risk plaques are prone to develop at bifurcations. We sought to evaluate the distribution and composition of atherosclerotic plaque at bifurcations with intravascular ultrasound–virtual histology (IVUS-VH) and multislice computed tomography (MSCT) and examine any potential influence of the bifurcation angle (BA).
**Methods:** From 25 patients (age 62±11 yrs, 80% male) imaged with IVUS-VH and MSCT, 25 bifurcations were matched and studied. For the analysis, the main vessel was divided into proximal 5mm segment, in-bifurcation segment and distal 5mm segment. Plaques were independently measured in MSCT by manually tracing plaque contours in serial cross-sectional reconstructions and in IVUS-VH by manual tracing of plaque borders. Plaques with >10% confluent necrotic core and <10% dense calcium by IVUS-VH were classified as fibroatheroma or thin-cap fibroatheroma and considered high-risk. Plaque composition by MSCT was graded as non-calcified, calcified (>50% calcium) or mixed. The BA was measured by MSCT on the multiplanar reconstruction view in which the angulation between the main vessel and side branch was maximal, using only diastolic datasets.
**Results:** Overall the mean plaque area decreases from proximal to distal segment (8.2±2.9 vs. 5.4±3.0 mm2 respectively by IVUS-VH, p<0.001 and 8.5±2.5 vs. 6.1±2.5 mm2 by MSCT, p<0.001). The percentage of necrotic core is higher in the proximal segment (21.2% vs. 15.4% respectively, p=0.017). The high-risk plaques were more often located in the proximal segment (8 of 16, 50%), followed by the in-bifurcation (4 of 16, 25%) and the distal segment (4 of 16, 25%). These plaques were characterized by MSCT as non-calcified (81%) and mixed (19%). The BA was wider for high-risk than other plaques at the proximal segment (73±19 vs. 54±19 degrees respectively, p=0.03) and for the non-calcified plaques vs. mixed/calcified (75±19 vs. 47±11 degrees, p=0.002).
**Conclusion:** The proximal segment of bifurcations is more likely to contain high-risk plaques, especially when the BA is wide.

## TCT-658

**Differential Healing Response in Acute Coronary Syndrome Versus Stable Coronary Artery Disease Patients 5 Years Following Early Generation DES Implantation: An Optical Coherence Tomography Study**

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**Background:** Patients with acute coronary syndromes (ACS) have a higher risk of very late stent thrombosis after implantation of early generation drug-eluting stent (DES) compared with patients with stable coronary artery disease. Post-mortem studies of patients treated with DES observed less complete strut coverage, more inflammation and fibrin deposition among ACS compared with stable CAD patients. Using optical coherence tomography, we compared stent strut coverage, protrusion, and malapposition as markers of vascular healing (OCT) between ACS and stable CAD patients 5 years after implantation of early generation DES.
**Methods:** A total of 88 patients with one lesion were suitable for final OCT analysis five years after DES implantation. The analytical approach was based on a hierarchical Bayesian random-effects model and compared strut coverage, protrusion and malapposition between ACS and stable CAD patients. The analysis was adjusted for differences in baseline patient characteristics (hypertension, hyperlipidemia, left ventricular function) and stent type.
**Results:** OCT analysis was performed in 53 ACS culprit lesions with 7,864 struts, and in 35 stable lesions with 5'298 struts. A total of 284 (1.73%) struts were uncovered in ACS culprit lesions compared to 97 struts (0.7%) in stable lesions, (adjusted p=0.041). Malapposed struts were present in 303 (1.33%) of ACS culprit lesions as compared with 106 (0.45%) of stable lesions (adjusted p=0.072). Protruding struts were more frequent among ACS culprit lesions 106 (0.50%) than stable lesions 0.34 (0.13%), (adjusted p=0.038).
**Conclusion:** Uncovered, malapposed and protruding struts are more frequent in culprit lesions of ACS patients compared with lesions of stable CAD patients 5 years after implantation of early generation DES. These findings suggest a differential healing response of ACS compared with stable CAD patients.